

Incoming 00150025

0079

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Date: 11/21/2006 12:36:06 PM
Subject: Federal Lease Addition

Attached is a copy of the response to the issues we identified during the telephone conference. The items are listed below

1. An estimate of how much water will be encountered in the Hiawatha workings. (This was added to the PHC pages 7-44 to 7-44D)
2. A discussion of what we will do with the water encountered. (This was added to the PHC pages 7-44 to 7-44D)
3. Update the streams on all maps to match 7-4. (This was done on Plate 5-3, 5-3A, and 7-12)
4. Send Betsy a current copy of all maps. (I never got her email address or mailing address. I am trying to get it from Dale.)
5. Add a 300 ft. barrier to above LF Fish Creek. (This change wasn't made as per the telephone conversation with Wayne 11-17-06. However, Plate 6-2 was updated to reflect accurate overburden contours and it now matches the BLM maps.)
6. Add a text discussion about the change in #5. (This discussion wasn't added since the change was never made.)
7. Add a discussion about the Mohrland portal water quality, and where it will go if the old workings are de-watered. (This was added to the PHC pages 7-44 to 7-44D)

I will be delivering hard copies to Price today and mailing out hard copies with a C1 and C2 form to SLC today.

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R645-301-727 Alternate Water Source Information

No alternate water source is needed since we do not expect to impact any current water sources as explained in R645-301-724.100 and R645-301-724.200.

R645-301-728 Probable Hydrologic Consequence Determination

~~See Appendix 7-J.~~ In 2001 C. W. Mining hired Mayo and Associates to do a detailed hydrologic study and a PHC of the current permit area and all areas of anticipated future mining. This study is included as Appendix 7J. The study area included the 2001 WHR permit expansion and the 2006 Federal Lease/Mohrland expansion areas. The study clearly identifies the areas during the introduction on page 1, and on the project area map on page 2. Additionally page 127 of the study states "This PHC determination is based on data and information presented in Sections 1-8 of this document." and "The hydrological evaluation presented in Section 1-8 of this report also includes the Mohrland area;" he continues by saying "however, C. W. Mining is not permitting the Mohrland area at this time." The last statement was correct at the time of the report, but is no longer correct since an application to add the Mohrland area was submitted to DOGM in 2005. This statement should be ignored when reading the document.

Additionally, at the time the report was done, no escarpment failure was planed in the left fork of Fish Creek, and the right fork of Fish Creek was not considered perennial where it flowed through the affected area. Because of this consequences related to these issues were not discussed in Appendix 7J.

728.100 PHC Determination

This is included in section 9.0 of Appendix 7J. For the left fork of Fish Creek there is one area where escarpment failure may reach the stream. This would cause a temporary increase in the sediment of the area. The impact would be short term and only affect the immediate area. Escarpment failure is discussed in detail in Appendix 5-C.

During field investigations conducted in 2006 it was determined that 4,000 feet of perennial stream in the right fork of Fish Creek exist in the affected area. Since fracturing of rocks is not expected to extend more than 250 feet above the coal seam and the minimum overburden thickness is 900 feet, no impact is expected. Additionally if any fracturing did occur it would immediately be sealed by the surface soil. Protection and monitoring of this area is discussed in Appendix 5-C.

As discussed in section 9 of Appendix 7J, upwelling from the Spring Canyon Sandstone will occur in the Hiawatha seam workings, but de-watering of the Spring Canyon Sandstone will not have any adverse impacts.

The areas of the Hiawatha seam that will be mined are immediately adjacent to the old Mohrland workings which have already impacted the Spring Canyon potentiometer surface. A cross-section between the surface wells in this area, MW-117 and MW-116, shows that MW-116 is only 2 feet lower in head pressure than MW-117. Although these maps are of limited value because of the lateral discontinuity of groundwater systems as explained on page 61 of Appendix 7J, an analysis of these levels and the proximity of the wells to the old workings has led us to conclude that the potentiometer surface get lower as it approaches the old workings. Additionally there is currently

water upwelling from the Spring Canyon Sandstone into the old workings.

There is currently an average of 250 gpm of water discharging from the old Mohrland mine portal. According to the Hiawatha permit PHC, 120 gpm of this water is generated in an area of King 5 mine 3 miles north of the Mohrland portal. The remaining water was encountered in areas sealed off prior to the mine water survey. This included most of the old Mohrland workings and large areas of the Hiawatha mines farther north. Based on this it can be concluded that the water discharge from the Spring Canyon Sandstone into the Mohrland workings is less than 130 gpm.

Historically in both the Hiawatha mines and in the Bear Canyon mines, when the Spring Canyon Sandstone is encountered in areas below the potentiometer surface a large flow of water is encountered that greatly decrease in flow in 1 to 2 months. The largest flow encountered was 250 gpm which decreased to 120 gpm in 2 months.

Based on this the maximum flow that will be encountered will be 250 gpm or less and will decrease to 120 gpm or less within a few months. Encountering this flow will most likely cause a decrease in the flow upwelling out of the Spring Canyon Sandstone in the old Mohrland workings. Since it would be the same water as the water currently upwelling into the old Mohrland workings the quality of the water would be the same as the water currently being discharge. Historically water monitoring data for this site can be obtained from the Divisions website. It is Hiawatha Mine water monitoring site D001. This water would be combined with the water currently coming from the Mohrland portal and would be discharged or used in the mining operation.

Due to safety concerns de-watering of the old workings will likely take place during initial development, and while retreat mining of long-wall panels 1, 2, and 3 of this block (see Plate 5-1B). U. S. Fuel officials reported that it took 18 months for these mine workings to fill up and begin discharging. Based on this the volume of water stored in the old workings is approximately 600 acre-ft.

C. W. Mining anticipates needing between 200 and 250 gpm during the long-wall mining operations. While mining is taking place in the Blind Canyon and Tank coal seams the water will come from the Bear Canyon #1 mine discharge and from treated surface waters as allowed by our shares in Huntington Cleveland Irrigation Company. When mining begins in the Hiawatha seam the Mohrland discharge will be intercepted and this water will be used. Because the in-flow will be diverted and the de-watering will take place over a 3 to 4 year period the discharge is not anticipated to be greater than the current rate of 250 gpm even if de-watering is taking place or if water is encountered in the new workings.

728.200 Baseline Information

This is discussed in Appendix 7J sections 3 through 7 and Appendix 7M and 7N.

728.310 Adverse Impacts to the Hydrologic Balance

This is discussed in section 9.1 of Appendix 7J

728.320 Acid/Toxic Forming Material

This is discussed in section 9.2 of Appendix 7J

728.330 Impacts of Proposed on:

728.331	Sediment Yield;	This is discussed in section 9.3 of Appendix 7J
728.332	Water Quality;	This is discussed in section 9.4 of Appendix 7J
728.333	Stream Flow Alteration;	This is discussed in section 9.5 of Appendix 7J
728.334	Water Availability;	This is discussed in section 9.6 of Appendix 7J

728.340-350 Affects on Water Resources and Water Rights

This is discussed in section 9.7 of Appendix 7J

R645-301-729 Cumulative Hydrologic Impact Assessment

See [Appendix 7-L](#).

R645-301-730 Operation Plan

R645-301-731 General Requirements

731.100 Hydrologic Balance Protection

Affects of Mining on Groundwater Balance

Mining operations in the permit area will be confined to the coal bearing strata within the basal part of the Blackhawk formation. The coal strata are generally dry throughout most of the permit area, with the Tank Seam being dry throughout the entire property, and are part of an undeveloped aquifer system, which consists of a series of generally discontinuous perched water zones within the Blackhawk formation. Overlying formations are not uniformly saturated. The Star Point Sandstone is unsaturated in the Southern and Eastern parts of the permit area, and saturated in all three tongues on the Northwestern end of the permit area. The potential groundwater impacts are discussed in detail in [Appendix 7-J, section 9.0](#). The potential impacts can be categorized into two basic sections: 1.) Potential impacts to groundwater quantity and 2.) Potential impacts to groundwater quality.

Quantity

Mining affects on water quantities consist of interceptions of local perched zones, and the interception of a larger perched aquifer at the North end of the Blind Canyon Seam workings. Investigations have shown that this aquifer is not hydraulically connected to Big Bear or Birch Spring ([Appendix 7-N](#)), so dewatering of this aquifer will have no impact on the quantity of these springs. These waters are collected in sumps within the mine and either diverted for culinary water and dust control or it is discharged into Bear Creek. Groundwater surveys are conducted and submitted annually to the Division. Groundwater is also removed as moisture within the coal itself, as evaporation in the mine ventilation air discharge, and in dust suppression. As discussed in the PHC, ~~the estimated volume of water removed in this manner is 22 acre-feet per year.~~ A calculation of maximum yearly water loss anticipated is included below.

Water Consumed During Production

Continuous Miner

Inherent Coal Moisture = 6% Mine Run Moisture = 7% Max Yearly Production = 400,000 tons
water loss = $((0.07-0.06)*400,000 \text{ Tons})*(2,000 \text{ lbs/1 TON})*(1 \text{ gal/8.33 lbs})*(1 \text{ acre-ft/325,850 gal})$
water loss = 2.95 acre-ft/year

Longwall

Inherent Coal Moisture = 6% Mine Run Moisture = 12% Max Yearly Production = 2,100,000 tons
water loss = $((0.12-0.06)*2,100,000 \text{ Tons})*(2,000 \text{ lbs/1 TON})*(1 \text{ gal/8.33 lbs})*(1 \text{ acre-ft/325,850 gal})$
water loss = 92.84 acre-ft/year

Surface Dust Suppression

Average water used for road watering = 600,000 gallons Average water used for stockpiles = 2 gallons/Ton
water loss = $600,000 + (2 \text{ gal/Ton} * 2,500,000 \text{ Tons}) = 6,043,371 \text{ gal/yr} = 18.55 \text{ acre-ft/year}$

Ventilation Loss

p_b = barometric pressure = 29.88 in. HG t_d = dry bulb temperature = 40°F, 45°F
 t_w = wet bulb temperature = 38°F, 43°F Q = Ventilation quantity = 160,250 inlet, 191,540 outlet
 p_s ' = sat. vapor press., wet bulb (in. Hg) = $0.18079 * e^{((17.27 * t_w - 552.64) / (t_w + 395.14))} = 0.023, 0.279$
 p_v = actual vapor pressure (in. Hg) = $p_s' - [((p_b - p_s') * (t_d - t_w)) / (2800 - 1.3 * t_w)] = 0.208, 0.257$
W = specific humidity (lb/lb dry air) = $0.622 * (p_v / (p_b - p_v))$ $W_I = 0.0043$ $W_E = 0.0054$
 p_a = partial pressure of air (in. Hg) = $p_b - p = 29.67 \text{ inlet}, 29.62 \text{ outlet}$

 v = specific volume (ft³/lb) = $(0.754 * (t_d + 460)) / p_a = 12.71 \text{ inlet}, 12.85 \text{ outlet}$

G = weight flow-rate (lb/h) = $60 * Q / v = 756,756 \text{ inlet}, 894,071 \text{ outlet}$ Average = 825,414
water loss = $G \text{ (lb/h)} * (W_E - W_I) * .016018 \text{ (ft}^3/\text{lb)} * 8766 \text{ (h/yr)} / 43560 \text{ (ft}^3/\text{acre-ft)} = 2.77 \text{ acre-ft/year}$

Water Produced – Antiquity water produced in the Bear Canyon #1 Mine

Average Flow = 30 gpm

Yearly water generated = $(30 \text{ gpm}) * (60 \text{ min/1 hour}) * (24 \text{ hour/1 day}) * (365 \text{ day/1 year}) = 15,768,000 \text{ gallons/year}$
water gain = $15,768,000 \text{ gallons/year} * (1 \text{ acre-ft/325,850 gal}) = 48.39 \text{ acre-ft/year}$

Total Maximum Water Loss = 2.95 + 92.84 + 18.55 + 2.77 - 48.39 = 69 acre-ft/year

The affects of subsidence in the permit area, on regional or local groundwater flow, are expected to be minor and of short duration. Localized diversions or interceptions of short duration only are expected due to the plastic flow of shaley units and to both development and tightening of existing fractures which occur due to unbalanced compressive-tensile forces associated with subsidence. The reclamation plan proposes to control post-mining subsidence which is expected to be a maximum of 5.5 feet assuming all three seams are mined, with no subsidence to occur in a varying 100 to 200 ft wide corridor from outcrop areas and permit boundary areas, as well as under escarpments.

In the portion of Federal Lease U-024316 to be permitted, mining will take place in the ~~Tank~~**Blind** Seam only, ~~which will limit any subsidence to a maximum of 1.9 feet.~~ In the event mining reaches far enough ~~North~~ to mine at an elevation below Bear Creek, an adequate barrier will be left to completely prevent any impact on Bear Creek. This barrier is shown on [Plate 5-3](#) and described in [Appendix 5-C](#).

Quality

The potential impacts to water quality include contamination of water due to rock dust usage, abandoned equipment, the usage of hydrocarbons, and contamination from road salting. These potential water quality impacts are discussed in detail in [Appendix 7-J, Section 9.0 \(PHC\)](#) and [Appendix 7-P](#).

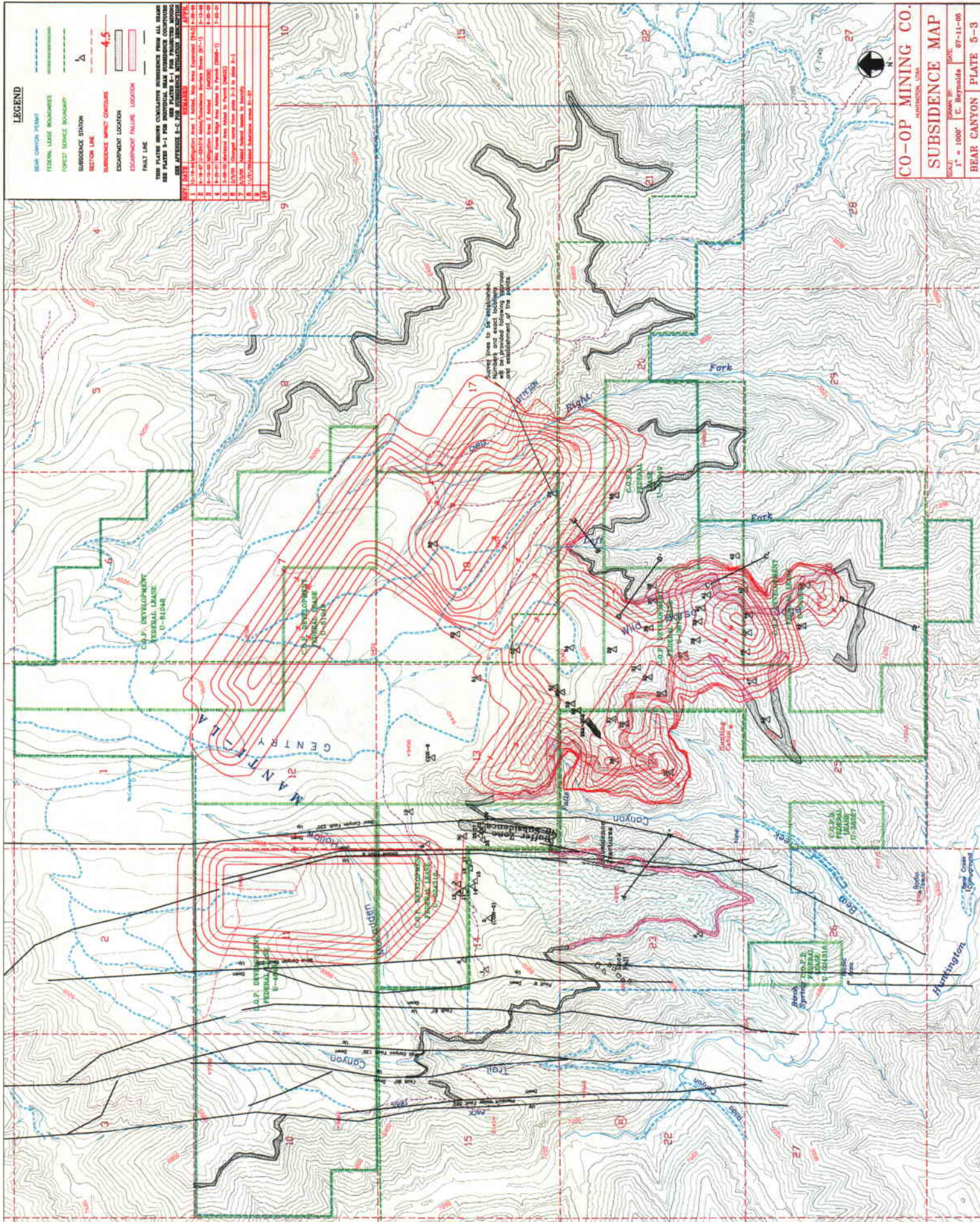
Rock dust which is used for the suppression of coal dust may potentially impact the groundwater flowing through the mine by the dissolution of the rock dust constituents into the water. This could result in increase concentrations of TDS or sulfates. Gypsum rock dust has been known to result in high TDS concentrations; therefore Co-Op has implemented the use of

LEGEND

- BEAR CANYON PERMIT
- FEDERAL LEASE BOUNDARIES
- FOREST SERVICE BOUNDARY
- SECTION LINE
- SUBSIDENCE IMPACT CONTOURS
- ESCAPMENT LOCATION
- ESCAPMENT FAILURE LOCATION
- FAULT LINE

THIS PLATE MAPS CALCULATED SUBSIDENCE FROM ALL BEAR CANYON PERMIT AREAS. SUBSIDENCE COMPUTATIONS ARE BASED ON 1-DIMENSIONAL ELASTICITY THEORY. SEE APPENDIX B-C FOR SUBSIDENCE MITIGATION INFORMATION.

BEAR CANYON PERMIT	SECTION	DATE	AREA	AREA (ACRES)	AREA (HECTARES)	AREA (SQ. KM)
1	1	10/1/00	1000000	1000000	1000000	1000000
2	2	10/1/00	1000000	1000000	1000000	1000000
3	3	10/1/00	1000000	1000000	1000000	1000000
4	4	10/1/00	1000000	1000000	1000000	1000000
5	5	10/1/00	1000000	1000000	1000000	1000000
6	6	10/1/00	1000000	1000000	1000000	1000000
7	7	10/1/00	1000000	1000000	1000000	1000000
8	8	10/1/00	1000000	1000000	1000000	1000000
9	9	10/1/00	1000000	1000000	1000000	1000000
10	10	10/1/00	1000000	1000000	1000000	1000000
11	11	10/1/00	1000000	1000000	1000000	1000000
12	12	10/1/00	1000000	1000000	1000000	1000000
13	13	10/1/00	1000000	1000000	1000000	1000000
14	14	10/1/00	1000000	1000000	1000000	1000000
15	15	10/1/00	1000000	1000000	1000000	1000000
16	16	10/1/00	1000000	1000000	1000000	1000000
17	17	10/1/00	1000000	1000000	1000000	1000000
18	18	10/1/00	1000000	1000000	1000000	1000000
19	19	10/1/00	1000000	1000000	1000000	1000000
20	20	10/1/00	1000000	1000000	1000000	1000000
21	21	10/1/00	1000000	1000000	1000000	1000000
22	22	10/1/00	1000000	1000000	1000000	1000000
23	23	10/1/00	1000000	1000000	1000000	1000000
24	24	10/1/00	1000000	1000000	1000000	1000000
25	25	10/1/00	1000000	1000000	1000000	1000000
26	26	10/1/00	1000000	1000000	1000000	1000000
27	27	10/1/00	1000000	1000000	1000000	1000000
28	28	10/1/00	1000000	1000000	1000000	1000000
29	29	10/1/00	1000000	1000000	1000000	1000000
30	30	10/1/00	1000000	1000000	1000000	1000000
31	31	10/1/00	1000000	1000000	1000000	1000000
32	32	10/1/00	1000000	1000000	1000000	1000000
33	33	10/1/00	1000000	1000000	1000000	1000000
34	34	10/1/00	1000000	1000000	1000000	1000000
35	35	10/1/00	1000000	1000000	1000000	1000000
36	36	10/1/00	1000000	1000000	1000000	1000000
37	37	10/1/00	1000000	1000000	1000000	1000000
38	38	10/1/00	1000000	1000000	1000000	1000000
39	39	10/1/00	1000000	1000000	1000000	1000000
40	40	10/1/00	1000000	1000000	1000000	1000000
41	41	10/1/00	1000000	1000000	1000000	1000000
42	42	10/1/00	1000000	1000000	1000000	1000000
43	43	10/1/00	1000000	1000000	1000000	1000000
44	44	10/1/00	1000000	1000000	1000000	1000000
45	45	10/1/00	1000000	1000000	1000000	1000000
46	46	10/1/00	1000000	1000000	1000000	1000000
47	47	10/1/00	1000000	1000000	1000000	1000000
48	48	10/1/00	1000000	1000000	1000000	1000000
49	49	10/1/00	1000000	1000000	1000000	1000000
50	50	10/1/00	1000000	1000000	1000000	1000000



CO-OP MINING CO.

SCALE: 1" = 1000'

DATE: 07-11-08

SUBSIDENCE MAP

BEAR CANYON PLATE 5-3

